Patent claims

1. A device (10) for measuring accelerations for a vehicle passenger protection system, the device being adapted to a prespecified main direction of measurement (20) and comprising:
at least one first acceleration sensor (12) with a first sensitivity direction (14), which forms a first main projection (22) in its projection onto the main direction of measurement (20), and a first transverse projection (32) in its projection onto a transverse direction (30) which is aligned vertically to the main direction of measurement (20), and a first evaluation channel for processing a first measuring signal from the first acceleration sensor in relation to a first reference value (R1);
a second acceleration sensor (16) with a second sensitivity direction (18), which forms a second main projection (24) in its projection onto the main direction of measurement (20), and a second transverse projection (34) in its projection onto the transverse direction (30), and a second evaluation channel for processing a second measuring signal from the second acceleration sensor in relation to a second reference value (R2); and evaluation devices for evaluating at least the first processed measuring signal (F1) and the second processed measuring signal (F2), and, at least partially, a trigger signal for the passenger protection system, which is generated on the basis of these; whereby
the first and second transverse projections (32, 24) in the first and second sensitivity directions (14, 18) are aligned parallel to each other, and the first and second main projection (22, 24) in the first and second sensitivity directions (14, 18) are aligned antiparallel to each other. Furthermore, the evaluation is conducted in such a manner that at least a partial error compensation results when the first

or second reference value (R1 or R2) in the first or second evaluation channel changes.

2. A device according to claim 1,
characterised in that
the evaluation is conducted in such a way dependant on the alignment of the first and second sensitivity direction to the main direction of measurement that the error compensation is at a maximum level when the first and second reference value ($\Delta 1$ and $\Delta 2$) is changed.

3. A device according to claim 1 or 2,
characterised in that
The first evaluation channel comprises a first initial threshold (T1) and the second evaluation channel comprises a second initial threshold (T2), and the evaluation comprising a comparison of a first evaluation function of the processed first measuring signal and the second processed measuring signal (F1) with a corresponding second evaluation function of the first initial threshold (T1) and the second initial threshold (T2).

4. A device according to claim 3,
characterised in that
the first evaluation function is a weighted difference or total of the processed first measuring signal F1) and the processed second measuring signal (F2), and the corresponding second evaluation function can be a weighted total or the difference between the first initial threshold (T1) and the second initial threshold (T2).

5. A device according to one of the above claims,
characterised in that

the first reference value (R1) and the second reference value (R2) are a reference value shared by the first and second evaluation channel.

6. A device according to one of the above claims,
characterised in that
the angular distance of the first sensitivity direction (14) and the angular distance of the second sensitivity direction (18) preferably does not equal 0° or 90°, both in the main direction of measurement (20) and in the transverse direction, and is in particular larger than or equal to 10°.

7. A device according to one of the above claims,
characterised in that
The angular distance between the first sensitivity direction (14) and that of the second sensitivity direction (18) is essentially 90°.

8. A device according to one of the above claims,
characterised in that
the angle of the first sensitivity direction (14) can be 45° or 135°, and the angle of the second sensitivity direction is essentially 45° and 135,° or -45°and -135°, or 225° and 315° to the main direction of measurement (20), and the angle of the second sensitivity direction (18) is essentially 135° and 45°, or -135° and -45°, or 315° or 225° to the main direction of measurement (20).

9. A device according to one of claims 1 to 8,
characterised in that
the main direction of measurement (20) is essentially the forwards direction (26) of the vehicle.

10. A device according to one of claims 1 to 8,
characterised in that

the main direction of measurement (20) is essentially vertical to the forwards direction (26) of the vehicle.

11. A device according to one of the above claims,
characterised in that
The first and second acceleration sensor (12, 16) and the evaluation devices are arranged in one central unit.

12. A device according to one of the above claims,
characterised in that
it furthermore comprises at least one upfront sensor (40) or at least one side sensor (42) or a safing sensor (44).

13. A procedure for measuring accelerations for a vehicle passenger protection system with the following stages:
i) The determination of a main direction of measurement (20) in relation to a forwards direction (26) of a vehicle
ii) The provision of a first acceleration sensor (12) with a first sensitivity direction (14), which forms a first main projection (22) in its projection onto the main direction of measurement (20), and a first transverse projection (32) in its projection onto a transverse direction (30) which is aligned vertically to the main direction of measurement (20)
iii) The provision of a second acceleration sensor (26) with a second sensitivity direction (18), which forms a second main projection (24) in its projection onto the main direction of measurement (20), and a second transverse projection (24) in its projection onto a transverse direction (30)
whereby the first and second transverse projection (32, 24) of the first and second sensitivity direction (14, 18) are parallel to each other, and the first and second main projection (22, 24) of the first and second sensitivity direction (14, 18) are antiparallel to each other.
iv) The processing of the first measuring signal from the first acceleration sensor (12) to form a first processed

signal (F1) in relation to a first reference value (R1) in a first evaluation channel for processing the first signal from the first acceleration sensor (12)

v) The processing of the second measuring signal from the second acceleration sensor (16) to form a second processed signal (F2) in relation to a second reference value (R2) in a second evaluation channel for processing a second signal from the second acceleration sensor (16)

vi) The evaluation of the first and second processed signal (F1 and F2) in relation to the corresponding first and second initial threshold (T1 and T2), so that at least a partial error compensation results when the first and second reference values (R1 and R2) in the first and second evaluation channel change.

14. A procedure according to claim 13,
characterised in that
the evaluation which is dependant on the alignment of the first and second sensitivity direction to the main direction of measurement is conducted in such a manner that the error compensation when the first and second reference value is changed is at the maximum level.

15. A procedure according to claims 13 or 14,
characterised in that
the evaluation in stage vi) comprises:

a) The formation of a weighted threshold summation function or threshold subtraction function for the first initial threshold (T1) and the second initial threshold (T2);

b) The formation of a weighted subtraction function or summation function of the processed first measuring signal (F1) and the processed second measuring signal (F2);

c) The comparison of the weighted subtraction function or summation function from stage b) with the weighted threshold summation function or threshold subtraction function from

stage a); and whereby the trigger signal is furthermore set into the trigger-ready state when the weighted subtraction function or summation function from stage b) exceeds the weighted threshold summation function or threshold subtraction function from stage a).

16. A procedure according to one of claims 13 to 15, **characterised in that** in stage b), the weighted subtraction function or summation function of the processed first measuring signal (F1) and the processed second measuring signal (F2) comprises the formula

$$a1*F1 - a2*F2 \qquad \text{or} \qquad a1*F1 + a2*F2$$

and a1 and a2 are scaling factors with 0 < b1, b2 < 1, and in stage a), the weighted threshold summation function or threshold subtraction function of the first initial value (T1) and the second initial value (T2) comprise the formula

$$b1*T1 - b2*T2 \qquad \text{or} \qquad b1*T1 + b2*T2$$

whereby b1 and b2 are scaling factors with 0 < b1, b2 < 1.

17. A procedure according to claim 16, **characterised in that**

$$a1 \approx \cos \alpha 1 \qquad \text{and} \qquad a2 \approx \cos \alpha 2$$

whereby $\alpha 1$ is the angle between the main direction of measurement (20) and the first sensitivity direction (14), and $\alpha 2$ is the angle between the main direction of measurement (20) and the second sensitivity direction (18).

18. A procedure according to one of claims 13 to 17, **characterised in that** The first reference value (R1) and the second reference value (R2) are a reference value shared by the first and second evaluation channel.

19. A procedure according to one of claims 13 to 18, **characterised in that**

in stages iv) and v) the processing of the first, or measuring, signal of the first, or acceleration, sensor (12 and 16) during the procedure comprises at least one integration of the measuring signal.